Polymer wrapped carbon nanotubes doing it all

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Published in:
Carbon Nanotubes and Nanostructures: Applications and Devices

Publication date:
2011

Polymer wrapped carbon nanotubes doing it all: from selection to self-assembly of semiconducting devices

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One of the most promising nano-materials for eventual incorporation into practical technologies is the single-walled carbon nanotube (SWNT). Although several solubilization and isolation methods for individual SWNTs have been recently reported, programmed self assembly of this superb material is a serious limit to further develop their use in technology.

Here I will show a flexible and potentially scalable solution meeting these needs using DNA block copolymers consisting of a single-stranded DNA block covalently connected to a hydrophobic polymer segment. This combination of materials enables each to contribute its full potential to the utilization of SWNTs in electronic devices. While the conjugated portion is able to select few semiconducting species, the DNA portion allows immobilizing the SWNTs in specific pre-determined position. The superiority of this self-assembly method is shown by the high-yield (98%) of working device fabricated.